STATEMENT OF THE LEGAL AND FACTUAL BASIS FOR THE TERMS OF THE PROPOSED PERMIT
[MDAQMD Rule 1203(B)(1)(a)(i)]

TITLE V FEDERAL PERMIT TO OPERATE
Facility named – Molycorp, Inc. – Mountain Pass Mine
67750 Bailey Road, Mountain Pass, CA 92366

Federal Operating Permit # 000500364

Issue Date: March 17, 2004

Processing Engineer:

William Weese
Air Quality Engineer

FACILITY IDENTIFYING INFORMATION:

Owner/Company Name:	MOLYCORP, INC.
Facility Names:	Molycorp, Inc. – Mountain Pass Mine
Facility Location:	67750 Bailey Road Mountain Pass, CA 92366
Mailing Address:	MOLYCORP, INC. P.O. BOX 124 Mountain Pass, CA 92366
MDAQMD Federal Operating Permit Number:	000500364
MDAQMD Company Number:	0005
MDAQMD Facility Number:	00364
Responsible Official: Title: Phone Number:	David Bhame Operations Manager (760) 856-7621
Facility "Site" Contacts: Phone Number:	Scott Honan Supervisor, Environmental Compliance (760) 856-7656 FAX (760) 856-2253
Facility "Off Site" Contacts: Phone Number:	none
Nature of Business: SIC Code: Facility Location:	Lanthanide Mining 1099 Lanthanide Mining& Processing UTM (Km) 634E / 3927N

STATEMENT OF THE LEGAL AND FACTUAL BASIS FOR THE TERMS OF THE PROPOSED PERMIT **[1203(B)(1)(a)(i)]**

Statutory and Regulatory Authorities: Pursuant MDAQMD Regulation 12, Program - Federal Operating Permits, a.k.a. Title V (Adopted 7/25/94, Amended 02/22/95, Additional Rules adopted 06/28/95, 7/31/95) and 02/05/96 FR 4217, in accordance with Rule 221 - *Federal Operating Permit Requirement*, 40 CFR 52.220(c)(216)(i)(A)(2) - 02/05/96 61 FR 4217 of the Clean Air Act of 1990, the Mojave Desert Air Quality Management District issues this permit.

Federal Operating Permit (FOP number: 000500364) for Molycorp, Inc. – Mountain Pass Mine, 67750 Bailey Road, Mountain Pass, CA 92366. Molycorp, Inc. – Mountain Pass Mine, Is a Lanthanide Mining & Processing facility, SIC Code: 1099 Lanthanide Mining& Processing

The Molycorp, Inc. – Mountain Pass Mine Title V Federal Operating Permit was developed by consulting District Permit conditions for existing equipment, SIP Rules and NSPS requirements for Federal Rules, applicable to the facility. MDAQMD Title V Program Rules were also consulted.

I. DESCRIPTION OF FACILITY AND PROCESSES:

LANTHANIDES

Capabilities at Mountain Pass range from extracting the ore out of the ground to producing high-grade lanthanide oxides. Surface mining methods are used to produce 2000 tons of crushed ore per day. The mill reduces the crushed ore even further in preparation for the froth flotation operation that yields bastnasite - a widely consumed mineral feedstock containing the natural ratio of lanthanide elements.

Although separations facilities are currently suspended, Molycorp has the capability to isolate the individual lanthanides through the beneficiation facilities. This results in high purity, high value products used in a wide variety of applications. We ensure product quality through the use of a state-of-the-art analytical lab.

Lanthanide products play a tremendous role in the daily lives of people as they depend on them for use in cell phones, televisions, computers, and transportation systems. The lanthanides are valuable for the environment as they pave the way for cleaner air and enable new pollution-control systems for the future. Molycorp's Mountain Pass Lanthanide mine is the ***only*** operational Western Resource for these essential elements.

MOUNTAIN PASS, CA - MINERALOGY

The Mountain Pass mine is one of those locations on earth where a fortuitous combination of geology and chemistry has brought the lanthanides together in a goodly concentration. Among the inorganic elements, several with similar properties are grouped together and collectively called the "lanthanides". The chemist's periodic table places them in a special position.

The Mountain Pass lanthanide ore deposit contains about 40% calcite, 25% barite, 10% strontianite, 12% bastnasite, 8% silica and minor amounts of other minerals.

The Mountain Pass mined mineral bastnasite contains seven lanthanides that are either concentrated or recovered at Mountain Pass, although others are present. The distribution of lanthanides is as follows:

ELEMENTS	Lanthanide Oxide Equivalent (LnO)
Cerium (Ce)	49.0%
Lanthanum (La)	33.0%
Neodymium (Nd)	13.0%
Praseodymium (Pr)	4.0%
Samarium (Sm)	0.5%
Gadolinium (Gd)	0.2%
Europium (Eu)	0.1%
Others	0.2%

MINING OPERATIONS

Mountain Pass, California is one of the few places on earth, and currently the only Western resource, where geology and chemistry came together to form an economically mineable lanthanide (rare earth) ore-body.

The Precambrian bastnasite ore deposit is 250 feet thick, has a strike length of 2300 feet, and dips into the ground at a 40-degree angle. Surface mining techniques have been employed since inception of commercial lanthanide operations in 1951. Mining is carried out with 85-ton haul trucks and 13 cubic yard front-end loaders. Geological projections, ore-body mapping, blast hole cutting assays, and metallurgical testing provide necessary input to ensure consistent, on-grade ore production. A stripping ratio of approximately 8 tons of waste per ton ore yields an 8.5% ore grade feed to the mill.

Today, approximately 50 years after inception of mining at Mountain Pass, the pit you see measures about 1500 feet in diameter and 500 feet deep.

MILLING OPERATIONS

Ore is hauled to a crushing plant, reduced to less than 3/8 inch in size, and fed to the ball mill where grinding liberates the mineral grains prior to froth flotation. The flotation operation concentrates the bastnasite ore from an initial 8.5% to a 60% Lanthanide Oxide (LnO) product. An enriched 70% LnO product is produced after flotation with a hydrochloric acid leach, which

dissolves the carbonate gangue. The bastnasite concentrates are thickened, filtered, and dried for shipment or sent to the separations facilities for further recovery operations.

SEPARATION OPERATIONS

Molycorp has the capability of producing lanthanide concentrates as well as high purity products in several forms. The separations facilities are temporarily suspended subject to the resolution of wastewater disposal issues.

Bastnasite is selectively leached to separate the insoluble cerium fraction from the other lanthanide elements. The cerium product is washed to remove any contaminants, then filtered and dried prior to packaging according to customer specifications.

The dissolved lanthanides proceed through impurity removal steps, then to solvent extraction cells where a collector preferentially extracts the heavier elements and rejects the lighter fraction. The heavier fraction is separated at the Europium recovery facility where Europium is extracted as a high purity oxide. The lighter fraction may be precipitated, thickened, filtered, dried and packaged as lanthanum concentrate or further purified via solvent extraction to produce high purity lanthanum, praseodymium, or neodymium products.

LABORATORY OPERATIONS

Mountain Pass mine professional analytical chemists are ISO 9002 certified in state-of-the-art analytical laboratory use. They utilize measurement systems including inductively coupled plasma (ICP) -atomic emission, ICP-mass, fusion disc X-ray fluorescence, and atomic absorption and UV-visible spectrometers.

These chemists perform traditional bench-scale wet chemical analysis for precise lanthanide results as well as particle size and surface area analyses for products requiring specific sizing specifications. Critical customer specifications for individual lanthanides and other elemental constituents are measured, tracked, and reported for in-process and final products ready for shipment. The lab instrumentation detects individual lanthanide elements from major concentrations down to part per million levels in a precise, accurate, and reliable manner.

The Laboratory Information Management System (LIMS) provides the needed storage capabilities necessary for the thousands of analyses performed monthly. LIMS instantaneous data retrieval feature supports material tracing ability from the ore through final packaging.

The following processes occur in this sequence. Part III of the Title V Permit contains permitted equipment (with operational conditions) listed in the order of this table:

PROCESSES
1 - Crushing Plant/Cement Load out & Storage
2 - Mill / Floatation Plant
2A - Mill / Floatation Plant
3 - 15% Aqua Ammonia System

4 - Separations Plant
4A - Separations Plant
4B - Separations Plant
5 - Cerium 96 Plant
6 - Specialty Plant
6A - Specialty Plant
6B - Specialty Plant
6C - Specialty Plant
7 - Miscellaneous Equipment

II. BACKGROUND:

The Federal Clean Air Act Amendments of 1990 established a nation-wide permit to operate program commonly known as "Title V". MDAQMD adopted Regulation XII [Rules 1200 - 1210] and Rule 221 - *Federal Operating Permit Requirement*; [Version in SIP = Current, 40 CFR 52.220(c)(216)(i)(A)(2) - 02/05/96 61 FR 4217], to implement the Federal Operating Permit, and received Interim Program Approval from EPA on March 6, 1996.

This *Statement of Legal and Factual Basis,* pursuant to Rule 1203(B)(1)(a)(i), is intended to assess the adequacy of this Title V Application and to explain the District's basis in composing the Title V - Federal Operating Permit. The Title V Federal Operating Permit application received before March 6, 1997 met the Part 70 application deadline for MDAQMD facilities. [NOTE: all MDAQMD facilities subject to Title V were required to submit Title V applications by March 6, 1997].

The facilities Title V Permit Application was reviewed and subsequently determined complete.

The District's approach to the Title V program is to issue a single Federal Operating Permit for the entire facility that satisfies the federal requirement for a permit under Rule 221 [*NOTE: MDAQMD maintains separate Title V and District permits programs*]. All Federal, State and most District only requirements, associated with the emission of air contaminants, are included in the Federal Operating Permit. All documents, which are not readily available to the public, and are necessary to support the permit, are to be included. The District has taken the approach that the following documents are readily available to the public, and therefore, are not included: Code *of Federal Regulations, California Code of Regulations and Health and Safety Code, District Rules and Regulations [both documents are current and appear in the California State Implementation Plan], the continuous emission monitoring system quality assurance and monitoring plans [available at the facility or the District's office], all test methods, copies of District Authorities to Construct and Permits to Operate [available at the District's office]*.

The USEPA, Region 9 was e-mailed a draft of the proposed permit on January 9, 2004 [a hard copy was mailed January 9, 2004]. The USEPA statutory 45-day review period will expire on or about March 11, 2004. The 30-day Public Notice will be published on January 27, 2004 and end

on February 25, 2004.

The District will review and consider all public and EPA comments and modify this "Statement of Basis" document and Title 5 Permit to address agreed to concerns before the proposed Title V Permit is issued.

Rule 1203 (D)(1) outlines Title V Permit content requirements as follows:

III. TITLE V PERMIT CONTENTS [Rule 1203 (D)(1)]:

All Federal Operating Permits shall contain, at a minimum, the following terms, and conditions:

A. Identification of Applicable Requirements:

1. Standard conditions for generally applicable requirements do not list those processes to which they apply as allowed by EPA's White Paper One, page 11, section 4, last sentence of paragraph 2.

2. Minor New Source Review (NSR). All existing permit conditions, which are based on previous authority to construct conditions, are considered applicable federal requirements because those pre-construction review actions resulted from SIP Rule 203 - *Permit to Operate* and SIP Rule 204 - *Permit Conditions*.

3. Federal Applicable/Enforceable Requirements:
District Rule 1201 (P): "Federally Enforceable" - Any requirement, condition or other term which is fully enforceable by USEPA pursuant to the provisions of 42 U.S.C. §7413 (Federal Clean Air Act §113) or the public pursuant to the provisions of 42 U.S.C. §7604 (Federal Clean Air Act §304).
District Rule 1201 (G): "Applicable Requirement" - Any of the following requirements, including requirements that have been promulgated or approved by USEPA through rulemaking at the time of permit issuance but have future effective dates, as they apply to a Facility or Permit Unit: ***Appropriate conditions are included in the Title V Permit to ensure compliance with the following requirements (a through i).***

   (a) Any standard or other requirement contained in the applicable implementation plan for the District, and any amendments thereto, approved or promulgated pursuant to the provisions of Title I of the Federal Clean Air Act (42 U.S.C. §§7401-7515).

   (b) Any term or condition of any preconstruction permit issued pursuant to regulations approved or promulgated under Title I of the Federal Clean Air Act (42 U.S.C. §§7401-7515).

   (c) Any standard or other requirement under 42 U.S.C. §§7411, Standards of Performance for New Stationary Sources (Federal Clean Air Act §111); 42 U.S.C. §7412, Hazardous Air Pollutants (Federal Clean Air Act §112); and any regulations promulgated thereunder.

   (d) Any standard or other requirement under Title IV of the Federal Clean Air Act (42 U.S.C. §§7651-7651o) or the regulations promulgated thereunder.

(e) Any requirements regarding monitoring, analysis, and compliance established pursuant to 42 U.S.C. §7414(a)(3), Record keeping, Inspections, Monitoring and Entry (Federal Clean Air Act §114); 42 U.S.C. §7661c(b), Permit Requirements and Conditions (Federal Clean Air Act §504); and the regulations promulgated thereunder.

(f) Any standard or other requirement governing Solid Waste Incineration Units under 42 U.S.C. §7429, Solid Waste Combustion (Federal Clean Air Act §129) and the regulations promulgated thereunder.

(g) Any standard or other requirement for consumer or commercial products under 42 U.S.C. §7511b(e) (Federal Clean Air Act §183) and the regulations promulgated thereunder.

(h) Any standard or other requirement of the regulations promulgated under Title VI of the Federal Clean Air Act (42 U.S.C. §§7671-7671q) unless the USEPA has determined that such requirement need not be contained in a Federal Operating Permit.

(i) Any national ambient air quality standard or increment or visibility requirement under part C of Title I of the Federal Clean Air Act (42 U.S.C. §§7401-7515), but only as it would apply to temporary sources pursuant to the provisions of 42 U.S.C. 7661c(e) (Federal Clean Air Act §504(e).

4. See the following discussions below:

<u>40 CFR Part 61, Subpart M - National Emission Standard for Asbestos</u>
This facility on an as needed basis is subject to Section 61.145 through 61.147 - standards for the demolition and renovation of asbestos. Historically, the facility has been in compliance with the requirements of these standards. ***<u>Appropriate conditions are included in the Title V Permit to ensure compliance with these requirements.</u>***

<u>40 CFR Part 82 - Protection of Stratospheric Ozone</u>
This facility is in compliance with the requirements of this part. Any servicing of air conditioners is performed by a qualified contracting company. ***<u>Appropriate conditions are included in the Title V Permit to ensure compliance with these requirements.</u>***

<u>40 CFR, Parts 60.7, 60.8 and 60.13; Subpart A - New Source Performance Standards, General Provisions</u>
Some facility equipment is not subject to the requirements of this part.
<u>Permit Shield included in the proposed Molycorp Title V Permit Part VI to address Non-Applicable NSPS Requirements for Molycorp Mountain Pass Mine.</u>

Citation	*Description*	*Explanation of Why Requirement is Not Applicable or How Requirement is Modified*
NSPS Subpart OOO	***New Source Performance Standards***	***This requirement is not applicable to the facility because the facility does not meet the definition of a "nonmetallic mineral processing plant" provided in***

	for Nonmetallic Mineral Processing Plants	***40 CFR 60.671.***
NSPS Subpart UUU	***Standards of Performance for Calciners and Driers in the Mineral Industries***	***This requirement is not applicable to the facility because the facility does not meet the definition of a "mineral processing plant" provided in 40 CFR 60.731.***

C. Emissions limitations and/or standards, including operational limitations, which assure compliance with all Applicable Requirements and a reference to the origin and authority of each term or condition contained in the Federal Operating Permit: ***Processes and Control Equipment Requiring Emission and Operational Limitations are stated in the Title V Permit conditions.***

D. Monitoring requirements including but not limited to: [40 CFR 70.6(a)(1)] [see following] ***Processes and Control Equipment Requiring Monitoring and Recordkeeping are stated in permit conditions. Records for 5 years stated in Title V Permit conditions.***

(i) All emissions monitoring and analysis methods required by an Applicable Requirement.

(ii) Periodic monitoring, testing or record keeping (including test methods sufficient to yield reliable data) to determine compliance with an Applicable Requirement that does not directly require such monitoring.

(iii) Necessary requirements concerning use and maintenance of equipment including the installation and maintenance of monitoring equipment.

Other - Facility Support Equipment
Underground gasoline tanks are given a PTO pursuant to District Rule 461. No NSPS, NESHAPS or MACT apply to underground gasoline tanks equipment at this facility. ***Appropriate conditions for underground gasoline tanks are included in the Title V Permit for this facility.***

E. Record keeping requirements, where applicable, including but not limited to: [see following] ***Processes and Control Equipment Requiring Monitoring and Recordkeeping are stated in Title V Permit conditions. Records for 5 years stated in Title V Permit conditions.***

(i) Records of required monitoring information including dates and times of sampling, operating conditions at the time of sampling, date of analysis, analytical techniques and methods, the person or company performing the analysis, and the results of the analysis.
(ii) The retention of all records for a period of at least five (5) years from the date of monitoring.

F. Reporting requirements, where applicable, including but not limited to: [see following] ***COMPLETED, requirements (i through ii) are in proposed Title V Permit.***
(i) Submittal of any required monitoring reports at least every six (6) months.
(ii) Prompt reporting of all deviations from permit requirements including those attributable to breakdown conditions. Prompt reporting shall be determined in compliance with District Rule 430.

G. Various Standardized Provisions and/or Conditions: [see following] ***COMPLETED, requirements (i through xii) are in proposed Title V Permit.***
(i) A severability clause.
(ii) A provision, which states that the permit holder shall comply with all conditions of the Federal Operating Permit. Any noncompliance constitutes a violation of the Federal Clean Air Act and is grounds for enforcement action; the termination, revocation and reissuance, or modification of the Federal Operating Permit; and/or grounds for denial of a renewal application.
(iii) A provision which states that the need to halt or reduce activity to maintain compliance with the provisions of the Federal Operating Permit, or for any other reason, is not a defense in an enforcement action.
(iv) A provisions, which states that the Federal Operating Permit may be modified, revoked, reopened, reissued or terminated for cause.
(v) A provision which states that the filing of an application for modification; a request for revocation and re-issuance, or termination; or notifications of planned changes, or anticipated noncompliance does not stay any condition of the Federal Operating Permit.
(vi) A provision, which states that the permit does not convey any property rights of any sort, or any exclusive privilege.
(vii) A provision which states that the Permit holder shall furnish to the District, within a reasonable time as specified by the District, any information that the District may request in writing to determine whether cause exists for modifying, revoking and reissuing, terminating or determining compliance with the Federal Operating Permit.
(viii) A provision which states that the Permit holder shall, upon request, furnish to the District copies of records required to be kept pursuant to conditions of the Federal Operating Permit.
(ix) A provision requiring the payment of annual permit renewal fees and other applicable fees as prescribed in District Rule 312.

(x) A provision stating that no permit revision shall be required under any approved economic incentives, marketable permits, emissions trading or other similar programs provided for in the permit.

(xi) Terms and conditions, if applicable, for reasonably anticipated operating scenarios identified by the Facility in its application which require the Facility, contemporaneously with making the change from one operating scenario to another, to record in a log at the Facility a record of the scenario under which it is operating; and ensure that each alternative operating scenario meets all Applicable Requirements.

(xii) Terms and conditions, if requested by the applicant, for the trading of emissions increases and decreases within the Facility to the extent any Applicable Requirements allow for such trading without case-by-case approval. Such terms conditions shall include all terms and conditions to determine compliance with all Applicable Requirements; and meet all Applicable Requirements.

H. Compliance Conditions: [see following] ***COMPLETED, requirements (i through x) are in proposed Title V Permit.***

(i) Inspection and entry requirements which require that the Permit Holder allow an authorized representative of the District to enter upon the Permit holder's premises, at reasonable times.

(ii) Provisions which allow an authorized representative of the District to have access to and copy any records that must be kept under conditions of the Federal Operating Permit.

(iii) Provisions, which allow an authorized representative of the District to inspect any Permit Unit, equipment, practice, or operation regulated or required under the Federal Operating Permit.

(iv) Provisions which allow an authorized representative of the District to sample or monitor substances or parameters for the purpose of assuring compliance with the Federal Operating Permits or with any Applicable Requirement.

(v) A Compliance Plan.

(vi) A restatement, if applicable, of the requirement that the Permit holder submit progress reports at least semiannually pursuant to a schedule of compliance. Such progress reports shall comply with the provisions of District Rule 1201(I)(3)(iii).

(vii) Certification requirements including the frequency of submission, not less than annually, for Compliance Certifications.

(viii) Requirements that method for monitoring compliance be included in the Compliance Certifications.

(ix) Requirements that all Compliance Certifications be contemporaneously submitted to USEPA.

(x) Any additional certification requirements as specified in 42 U.S.C §7414(a)(3), Recordkeeping Inspections Monitoring and Entry (Federal Clean Air Act §114(a)(3)) and 42 U.S.C. §7661c(b), Permit Requirements and Conditions (Federal Clean Air Act §503(b)) or in regulations promulgated thereunder.

I. Fugitive Emissions: ***COMPLETED, control equipment and requirements are addressed in proposed Title V Permit.***

(i) Fugitive emissions shall be included in the permit and permit conditions in the same manner as stack emissions.

IV. CONCLUSIONS AND RECOMMENDATION:

In conclusion, the proposed Facility Title V Permit has been found to satisfy all of the requirements of District Rule 221, Rule 312, Regulation XII Rules, and the District's Title V Permit Program requirements.

Therefore, it is recommended that this Title V - Federal Operating Permit be issued to satisfy these requirements on March 17, 2004.

APPENDIX "A"

DISTRICT / SIP RULE COMPLIANCE DEMONSTRATIONS:

A. Rule 406: Owner/Operator shall not discharge into the atmosphere from this facility, from any single source of emissions whatsoever, Sulfur compounds, which would exist as a liquid or gas at standard conditions, calculated as sulfur dioxide (SO_2) greater than or equal to 500 ppm by volume.
[40 CFR 70.6 (a)(1) - Periodic Monitoring Requirements] (for Periodic Monitoring Requirements, see: Part II, section A, condition 22; Part III, section C, conditions 11 and 22; Part V, section C, condition 4; Part V, section D, condition 3; Part V, section I, condition 3)
[Rule 406 - *Specific Contaminants*; Version in SIP = 07/25/77, 40 CFR 52.220(c)(42)(xiii)(A) - 12/21/78 43 FR 52489, Subpart (a) only; Current Rule Version = 02/20/79]

Rule 406 specifies standard conditions, but not dry. Standard conditions for Rule 406 will be calculated as wet.

Calculate the SO_2 concentration in the diesel fueled IC engine exhaust gas using the following assumptions/calculations:

1. Maximum sulfur content of the diesel fuel is by permit condition: 0.05 % by weight.
2. Specific gravity of diesel fuel is 0.84: weight of one gallon of diesel fuel is: 8.33 lb/gal x 0.84 = 7 lb/gal.
3. Heating value of diesel fuel from U.S. EPA AP-42, Section 3.3: 19,300 Btu/lb.
4. Gallons of fuel required for 10^6 Btu: 1 lb/19,300 Btu = x lb/ 10^6 Btu: x = 51.8 lb: (51.8 lb)(1 gal/7 lb) = 7.4 gallons per 10^6 Btu.
5. Pounds of sulfur per 10^6 Btu (7.4 gallons): (7.4 gal)(7 lb/gal)(0.0005) = 0.0259 pounds.
6. Mols of sulfur per 10^6 Btu: 0.0259 lb/ 32 lb/mol = 8.09 x 10^{-4} mols.
7. Volume of SO_2 produced; assuming that one mol of sulfur produces one mol of SO_2; 8.09 x 10^{-4} mols of SO_2 are produced per 10^6 Btu of diesel burned: (385 ft^3 / mol)(8.09 x 10^{-4} mols) = 0.312 $ft^{3:}$ (385 ft^3/mol is at 68 degrees Fahrenheit).
8. From 40 CFR 60, Appendix A, Method 19 the F_w factor for diesel is 10,320 wscf / 10^6 Btu (68 degrees Fahrenheit, 0 % excess O_2). Rule 406 specifies the SO_2 concentration at standard conditions, wet, not dry.

For purposes of this calculation, excess air from the combustion process will not be considered in calculating the SO_2 concentration & is the most conservative assumption:
Concentration of SO_2 at zero percent oxygen:

$$0.312\ ft^3/(0.010320 \times 10^6\ wscf) = 30.2\ ppmv$$

Conclusion: Diesel fueled IC Engine exhaust SO_2 concentration of 30.2 ppmv complies with Rule 406 SO_2 limit of 500 ppmv.
It is assumed that the SO_2 concentration in natural gas fueled IC engine exhaust gas will be conservatively less than that demonstrated above for diesel combustion:

Calculate the CO concentration in boiler exhaust gas using the following assumptions/calculations:

1. Based on U.S. EPA AP-42; Section 1.4, Table 1.4-2, lists the CO emission factor for natural gas combustion in boilers to be 35 lb CO per 10^6 ft^3 of natural gas burned. Assume 1000 Btu / ft^3 of natural gas.
2. From 40 CFR 60 Appendix A, Method 19, the F_d factor for natural gas is 8710 dscf /10^6 Btu (68 degrees Fahrenheit). Rule 407 specifies the CO concentration on a dry basis.
3. For the purposes of this calculation, excess air will not be considered in calculating the CO concentration (most conservative):

   Cubic feet of CO produced per 10^6 ft^3 of natural gas burned:
   (35 lb) (1 lb mol / 28 lb) (385 ft^3 / mol) = 481 ft^3 CO (385 ft^3 / mol at 68 degrees Fahrenheit)

   Dry cubic feet of combustion gas formed from 10^6 ft^3 of natural gas burned:
   (10^6 ft^3 gas) (1000 Btu / ft^3) (8710 dscf / 10^6 Btu) = 8,710,000 dscf

   CO concentration = 481 ft^3 / 8.71 10^6 ft^3 = 55.2 ppm (most conservative)

   Conclusion: Boiler exhaust CO concentration of 55.2 ppmv complies with Rule 407 CO limit of 2000 ppmv.

B. Rule 409: Owner/Operator shall not discharge into the atmosphere from this facility from the burning of fuel, combustion contaminants exceeding 0.23 gram per cubic meter (0.1 grain per cubic foot) of gas calculated to 12 percent of carbon dioxide (CO_2) at standard conditions averaged over a minimum of 25 consecutive minutes.
[Rule 409 - *Combustion Contaminants*; Version in SIP = CARB Ex. Order G-73, 40 CFR 52.220(c)(39)(ii)(C) - 09/08/78 43 FR 40011; Current Rule Version = 07/25/77]

Calculate the Total Particulate Concentration in the diesel fueled IC engine exhaust gas using the following assumptions/calculations:

1. Based on U.S. EPA AP-42, Section 3.4, Table 3.4-5, the emission factor for total particulate is 0.0697 lb/10^6 Btu. (= 487.9 grains/10^6 Btu)
2. From 40 CFR 60, Appendix A, Method 19 the F_w factor for diesel is 10,320 wscf/10^6 Btu (68 degrees Fahrenheit, 0 % excess O_2). Rule 409 specifies the Particulate concentration at standard conditions, wet, not dry.

For purposes of this calculation, excess air from the combustion process will not be considered in calculating the Particulate concentration & is the most conservative assumption:

Concentration of Particulate at zero percent oxygen:

(487.9 grains/10^6 Btu) / (10,320 wscf/10^6 Btu) = 0.047 grain/ft^3

Conclusion: Diesel fueled IC Engine exhaust Total Particulate concentration of 0.047 grain per cubic foot complies with Rule 409 limit of 0.1 grain per cubic foot.

It is assumed that the Total Particulate concentration in natural gas fueled IC engine exhaust gas will be conservatively less than that demonstrated above for diesel combustion: